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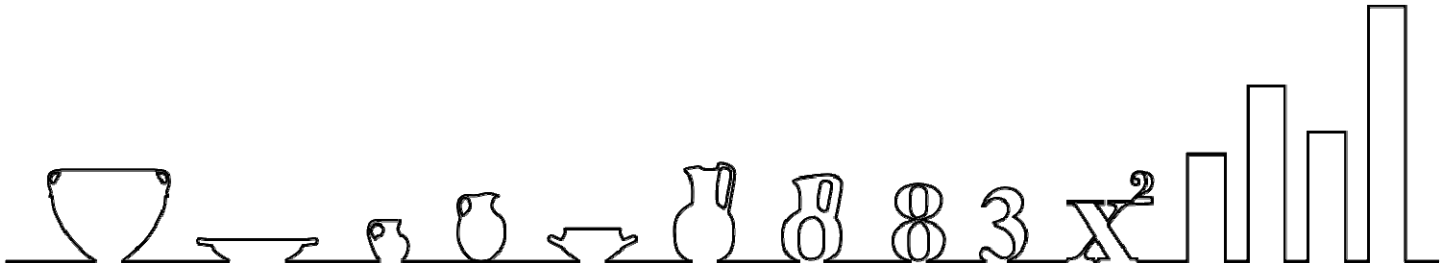

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QUANTITATIVE ANALYSIS OF THE POTTERY FROM THE EARLY IRON AGE NECROPOLIS OF TSIKALARIO ON NAXOS

Xenia CHARALAMBIDOU

Abstract

This paper focuses on the quantitative analysis of the pottery from the Early Iron Age necropolis of Tsikalario on Naxos that is currently in progress. The use of quantification on the Tsikalario ceramic material may be regarded as a tool that can lead to a better understanding of the practices observed at Tsikalario, such as production and consumption patterns, and to a clearer recognition of the similarities and differences between the Tsikalario necropolis in inland Naxos and the burial sites in the main town of Naxos (Chora).

Keywords: Naxos, Tsikalario, burial studies, pottery, quantitative analysis, MNI

INTRODUCTION

In this article I want to discuss the application of quantitative ceramic analysis at the Early Iron Age burial site of Tsikalario in central Naxos in the Cyclades. The principal aim of this paper is to report on the process of conducting this type of analysis, especially the variables and the method employed in the quantification of the Tsikalario ceramic assemblages.[1] I would also like to highlight some key questions that emerge from the ongoing study of the pottery from this site.

At the Tsikalario burial site (Fig. 1), the ceramic material, which comes from a range of constructions, presents a challenge for the application of quantitative analysis.[2] According to the excavator of the site, Dr. Photini Zaphiropoulou, cremation was practiced in a significant number of burials.[3] The most impressive examples from Tsikalario, which as far as we know are unique on Naxos, consist of circular and elliptical funerary structures (grave enclosures or *periboloi*) that on account of their form share certain similarities with tumuli (e.g. Figs. 2a–b and 3). As the excavator notes, other types of burials have been found at the site.[4] A significant number of Tsikalario's funerary structures can be placed in the Middle Geometric (MG) period, but more sporadic burials and offerings were deposited in the necropolis area at least as late as the Late Archaic – Early Classical period.[5] Besides the indisputable funerary structures, other constructions such as the buildings in sectors (areas) A, B and C were discovered at Tsikalario (Fig. 1). Some scholars have linked these buildings to funerary and chthonic cults, while others argue that the complex of rooms in sector B represents a residential area.[6]

QUANTITATIVE APPROACHES TO BURIAL STUDIES

Cemeteries with constructions of various kinds are known from many sites in Early Iron Age Greece; on Naxos they are also found in the Grotta area and the Metropolis area at Chora, where, in addition to burials, other structures such as enclosures and platforms have been uncovered that indicate ancestor cult activities.[7] In such multi-function sites, it would be worthwhile to quantify not only the material that comes from the graves but also the material from the other constructions in order to understand the nature and extent of the rites that may have taken place in the cemetery context.

Quantitative approaches to material from burial sites can be valuable in the framework of contextual archaeology[8] because they can help in systematizing the study of mortuary data and thus contribute to more soundly constructed interpretations. However, studies which apply quantitative approaches have faced difficulties in processing burial data. More widespread use of quantitative analyses of burial evidence dates from the 1970s, initially influenced by the work of Saxe (1970) and Binford (1971). Since then, various methods of analysis have been used, and different mortuary variables have been tested mainly in order to highlight social aspects of mortuary practices, such as the status of the deceased.[9] Nevertheless, as McHugh argues, correlating social structure and burial data analysis has to confront several problems mainly because ideas about social structure can be so indistinctly expressed that there is sometimes no clear agreement on what results are expected from quantitative analyses.[10]

[1] My study of the Tsikalario ceramic material began in 2008.

[2] For the excavations at Tsikalario, and the material evidence see Doumas 1963, 279–280; Papadopoulou-Zaphiropoulou 1965, 515–522; 1966, 391–395; Zaphiropoulou 1983, 1–4; 2001a, 285–292; 2001b, 7–11; 2008–09, 49–55; Charalambidou 2008–09, 57–69.

[3] Papadopoulou-Zaphiropoulou 1965, 515, 518, 520; 1966, 393; 2001a, 287; Kourou 1999, 166, note 527.

[4] Zaphiropoulou 2008–09, 49. See, for instance, the cist grave, which probably belonged to a child, by rectangular enclosure 11 in Papadopoulou-Zaphiropoulou 1965, 520–522, fig. 18; Zaphiropoulou 2001a, 291, fig. 25; 2008–09, 49, figs. 12–13.

[5] See also Charalambidou 2008–2009, 58.

[6] Buildings in sectors A, B, and C classed as cultic: Zaphiropoulou 1983, 2; 2001a, 292; 2008–09, 50. Themelis 1975, 24–25, 40–42; 1976, 240–241; Lauter 1985, 170–176; Mazarakis Ainian 1997, 191–193, 330. Sector B complex identified as a residential area: Drerup 1969, 51; Kourou 1988, 32; Coldstream 2003, 92.

[7] Lambrinoudakis 1988, 235–246; Antonaccio 1995, 201–202, 246, 250; Mazarakis Ainian 1997, 188–189; Morris 2000, 246–249; Charalambidou 2008–09, 59.

[8] The term is used according to Hodder 1987, 1–10 and Whitley 1994, 52. See also Morris 2000, 18–24, with an evaluation of contextual/post-processual archaeology.

[9] For a survey of quantitative approaches in the field of mortuary analysis, see McHugh 1999, especially 62–84.

[10] McHugh 1999, 63.

Aside from the practical problems of quantifying burial data, the lack of clearly articulated approaches may result in the incomplete publication of material from excavated sites and in the neglect of aspects of mortuary practices that could better be understood through quantitative analysis.[11] Furthermore, quantification-based studies in the mortuary domain have not been particularly common in the scholarship on Early Iron Age Greece.[12] Little published research is available that applies quantitative analysis even to individual Early Iron Age cemeteries, so that there is a need to present such analyses for individual burial sites in order eventually to be able to compare results for data from different locations and observe the similarities and differences. It is moreover essential for each researcher to explain his/her analytical approach as precisely and systematically as possible so that the comparison of results can be performed more effectively.

QUANTIFICATION

At Tsikalario the ceramic evidence constitutes the largest category of material data from the site. Quantification can therefore begin with the ceramic material, especially pottery,[13] although this type of analysis should be considered only one element of the examination of the varied aspects of the mortuary domain.

Pottery variables

Before describing the quantification method for the pottery from Tsikalario, I want to comment on how I selected the variables for the ceramic-based analysis currently in progress.[14] The variables being considered are primarily related to matters of production and consumption.[15] For other variables, such as how the choice of grave goods (including the ceramic items) may have functioned as indicators of status, we would first need to show clear grounds for associating certain types or quantities of grave goods with the question of the status of the deceased.[16]

The variables connected with matters of production and consumption are the following:

– *Fabric types*: fabric types in the Tsikalario ceramic material are classified primarily according to macroscopic observations[17] which will be refined by microscopic examination of the artefacts. Pottery categories (fine, semi-fine, and coarse wares) are described in order to make it easier to distinguish between different fabrics.[18]
– *Manufacturing techniques*: the identification of forming and finishing techniques offers evidence of the potters' practices and to some extent can provide information on consumption patterns. At Tsikalario, in addition to fine and semi-fine wheelmade and coarse handmade vessels, other categories have been noticed, such as coarse vessels with evidence of the use of the potter's wheel (the possibility that other manufacturing techniques besides full wheel-throwing were applied is being examined).[19]
– *Vessel shapes and types*: shape classification is a prerequisite for quantifying ceramic assemblages. Quantification based on shapes can provide information on consumption practices in each of the constructions at Tsikalario, thus facilitating comparisons of the material data between the different structures. Furthermore, classification and quantification of the pottery assemblages from the Tsikalario necropolis in each chronological phase, based on different shapes and types, significantly enhances our knowledge of workshop characteristics.
– *Vessel decoration*: classifying and quantifying pottery decoration for the purposes of workshop style identification must take a number of sub-variables into account, such as the form and composition of motifs, and the need to make distinctions between primary and secondary motifs.[20]
– *Vessel dimensions*: in addition to the preceding variables, estimating the dimensions of several different vessels of the same shape and type may reveal degrees of standardization or variability connected with issues of production rates.[21] An examination of the sizes of vessels moreover takes us beyond production issues, leading to observations concerning age differentiation between adult and child burials.[22]

In all the previous variables (attributes), assigning database values (coding) to the evidence is of great importance in order to quantify the data.[23]

Methodology

At Tsikalario the fact that ceramics from various funerary structures and buildings in sectors A, B and C were discovered in different states of preservation makes it necessary to choose a uniform quantification method for evaluating the pottery from the site. Due to the complexity of the Tsikalario

[11] Cf. Stissi 1999, 95.

[12] Some exceptional studies presenting quantified Early Iron Age mortuary data are: Morris 1987; 1992, 174–199; Whitley 1991; Papadopoulos 2005; Kotsonas 2008.

[13] Artefacts from other ceramic categories such as spindle whorls will also be calculated.

[14] The results of this quantitative analysis will be incorporated in the final publication of the ceramic material from the Tsikalario necropolis.

[15] Similar systems of attributes/variables in Rice 1989, 111, 113.

[16] For critiques of interpretations of the status of the deceased in the funerary ritual, see Hodder 1982, 119–122, 185–211; McHugh 1999, 51–61; Boyd 2002, 11–14.

[17] Suggested recording systems for macroscopic observations of pottery from archaeological sites: Orton, Tyers and Vince 1993, 231–242.

[18] For pottery classification relevant to fine, semi-fine, and coarse ware categories (based on frequency, size, sorting, and roundness of inclusions), see Matthew, Woods and Oliver 1991; Orton, Tyers and Vince 1993, 139, 235–240.

[19] Recent researches in ancient pottery-forming technology have indicated the existence of intermediate possibilities between hand-modelling and full wheel-throwing, and have furnished evidence of the use of various forms of rotational devices for manufacturing pots: Rye 1981, 64–65; Roux and Courty 1998, 747–763; Knappett 1999, 101–129.

[20] For design classification, see Plog 1980, 40–53.

[21] Kiriatzi 2000, 231–249; Roux 2003, 768–782.

[22] Some vessels of small dimensions, whose shapes appear in larger sizes in other burials at Tsikalario, were present in the cist grave by enclosure 11, which probably belonged to a child (Charalambidou 2008–09, 61).

[23] Whitley 1991, 77; McHugh 1999, 63–64, 70–71.

ceramic assemblages, the MNI (Minimum Number of Individuals) quantification method, better known in connection with settlement and sanctuary pottery assemblages, has been used experimentally because it considers both the number of whole pots (complete vessel profiles) and the fragmentary vessels.[24] The MNI is worked out principally from the number of different rims and bases—in practice, rims are mainly taken into account—and added to the number of complete profiles.[25] Quantification at Tsikalario is first applied to the pottery from each individual (undisturbed) construction.[26] In the funerary structures where only whole vessels have been found, they can be counted as complete vessel profiles. An estimation of the minimum number of vessels (MNI) is useful not only for analyzing the contexts of buildings in sectors A, B and C, which have yielded fragmentary ceramic material, but also for the funerary structures which contained whole pots and vessels in a fragmentary state. At present the ceramic assemblages from the above structures have been counted in the following way: first, complete vessels were counted (after mending); then in cases where fragmentary material was found, the number of rims was added. For the additional calculation of body and/or base fragments, the MNI method uses the 'compensation by 1' principle, which means that "any category or shape represented in an assemblage by one or more sherds other than rims is compensated by a value of '1' ".[27] This quantification was applied at a stage following conservation and mending at the Naxos Museum.[28]

A case study

We briefly present here as a case study the estimated minimum number of vessels—mainly MG—from the interior of funerary structure 6, where cremation was performed:[29] besides whole pots, a number of vessels were found broken in pieces there. This structure can be regarded as a closed context, which for the purposes of this paper makes it more straightforward. My observations here concern the variables of fine, semi-fine, and coarse ware categories, and shape.[30] The vessels in the interior of structure 6 represent two basic pottery categories, fine/semi-fine (in the context of this paper, fine and semi-fine categories are grouped together, henceforth referred to as FSF) and coarse ware.[31]

The preliminary results from the quantitative analysis show the presence of a minimum of 23 pots.[32] The interior of structure 6 yielded a number of complete vessel profiles, coming from the centre of the structure (in area A, Fig. 2a), where Zaphiropoulou reported the discovery of a cremation pyre, and area ΣΤ, where several vases were found in an inverted position. In area E and areas Β-Γ, most vessels were found broken in pieces;[33] in area E some of the vessels in pieces belong to the same shapes (and, it is likely, types) and have similar fabric characteristics. For this reason their complete restoration is difficult and the MNI method was used in order to estimate their minimum number.

Though the sample presented in this paper is small, it is best illustrated by a table (Fig. 4) that notes the distribution of the ceramic evidence in the areas of its discovery inside the structure, and by graphs which depict the ceramic material regardless of the area where it was found within the structure (Figs. 5a–b). The majority of this material seems to be of Naxian manufacture. All the FSF vases in structure 6 are wheelmade, while most of the coarse vessels are handmade. Eight storage vessels were discovered in structure 6, of both FSF and coarse categories. They comprise amphorae and pithoi of different types (e.g. Figs. 6a, c–d). Two FSF pouring vases (in area ΣΤ) and one coarse burnished pouring vessel (in area A; Fig. 6b) were discovered, while skyphoi and cups, which represent almost all of the drinking vessels, are of the FSF ware type (at least twelve; e.g. Figs. 6e–f). The coexistence of both FSF and coarse wares demonstrates that both categories were thought suitable for funerary functions in the interior of a funerary structure at Tsikalario. Three of the coarse vessels exhibit more elaborate manufacture: the amphora with horn-like handle terminals (Fig. 6a) and the burnished small jug with horizontal rim (Fig. 6b) in area A, and the tripod pithos with incised decoration found in pieces in areas Β-Γ (Fig. 6d).

[24] For the MNI (Minimum Number of Individuals) method, see Arcelin and Tuffreau-Libre 1998, 141–157 (I–XVII), as well as the Athens Round Table editors' guidelines. A consideration of other quantification methods will be possible in future for the Tsikalario ceramic material: see Orton, Tyers and Vince 1993, 166–181.

[25] Arcelin and Tuffreau-Libre 1998, VIII.

[26] An estimation of the number of vessels is irrelevant for certain funerary structures at Tsikalario whose interior was found partly robbed; in these cases quantification is not used for the remaining material in the interior of the structures.

[27] See Arcelin and Tuffreau-Libre 1998, XI, and the Athens Round Table editors' guidelines. At Tsikalario, in cases where it is obvious that the body and/or base fragments do not belong with vessels already counted, their number is normally calculated. I think that handle fragments rarely constitute a secure quantification sample because their association with vessels already quantified is frequently unclear.

[28] I note that, besides the entire vessels, the number of sherds, including recent breakages, from the whole ceramic assemblages of Tsikalario of all phases reaches ca. 11030 fragments.

[29] Funerary structure 6 was reportedly found unrobbed: Papadopoulou-Zaphiropoulou 1965, 515–522; Zaphiropoulou 2001a, 288–289. The ceramic material coming from the vicinity of structure 6 will not be presented in this paper.

[30] For a preliminary description of the vessel shapes from Tsikalario, see Charalambidou 2008–09.

[31] Pottery categories are based on macroscopic examination of the material in the interior of structure 6. The FSF vessels show a frequency of inclusions 3% with size mainly 0.5/1.0 – 0.5/2.0 mm (after the percentage inclusion estimation charts of Matthew, Woods and Oliver 1991, 216, 240). The inclusion frequency of the coarse wares ranges from 10% with size 0.5/3.0 mm to 35% with size 0.5/7.0 mm (after Matthew, Woods and Oliver 1991, 240, 244, 246). Future petrographic analysis will enable a more detailed classification among vessels of these two basic categories.

[32] The quantitative analysis will be repeated in the future to verify the results. Approximately 740 sherds were recovered from the 1960s excavation inside structure 6 (Number of Remains, NR), plus 160 sherds which are mainly surface material from the upper layers of the funerary structure and its vicinity. For this estimate every fragment was counted, including the fragments resulting from recent breakage. For the ca. 160 fragments of surface material, the MNI method was not used because a good number of these fragments are small and it was difficult (especially for those belonging to coarse vessels) to conclude whether they came from the same or different pots.

[33] For this reason there is some uncertainty in determining the shape of some vessels in area E which were restored from fragments (see Fig. 4; these vessels are indicated by a question mark).

CONCLUDING OBSERVATIONS

This elementary quantification of the evidence from the interior of structure 6 contributes to a better appreciation of the nature of the material found in the structure; this method of analysis can best be regarded as a tool to help develop a comprehensive interpretation of the evidence. Besides helping to trace production practices, study of consumption patterns observed in structure 6 can be facilitated by such an analysis, but the way to finding out exactly what they mean remains difficult, not least because this material comes from a relatively old excavation. Bones were reported by the excavator to have been found in areas A and E.[34] It may not be mere coincidence that these are the same areas where more storage vessels were discovered (Fig. 4). Questions regarding the function of these vessels arise which may be illuminated by the application of organic residue analysis to this material where conditions permit.[35] Storage vessels are among the most common sorts of burial urns in many different parts of Early Iron Age Greece—for instance amphorae at Athens and amphorae and pithoi at Knossos.[36] On Naxos, wheelmade amphorae are reported to have been used in cremations at the 10th – 8th century BC Plithos Cemetery in Chora,[37] while a MGI handmade tripod pithos with incised and stamped decoration from the South Cemetery in Chora is assumed to have been used as a burial urn.[38] One or more of the eight storage vessels—amphorae and pithoi—in Tsikalario structure 6 may therefore have served as urns. The possibility that other shapes besides storage vessels may also have been urns cannot be excluded, although we have no supporting evidence at present from the burial sites of Naxos.[39]

There are cases elsewhere in Greece—the Attic belly-handled amphorae from the Knossos North Cemetery—where some storage vessels may have served as containers for carrying liquid offerings for the deceased.[40] It is noteworthy that in area A of structure 6 three storage vessels were discovered together: a coarse amphora (Fig. 6a), a coarse plain pithos (Fig. 6c) and a FSF wheelmade amphora (the pouring vessel and drinking vases in Fig. 4 were found in the same context). Were they all urns, or could any of them have been used as a container for liquid (or foodstuffs)? The same question may be asked regarding the other storage vessels from structure 6, some of which were found in pieces, as well as the ceramic material from structure 10, another of Tsikalario's funerary structures (Fig. 3), where a coarse plain pithos and a coarse tripod pithos with incised decoration (similar to those from structure 6; see Figs. 6c– d) were discovered together with pouring and drinking vessels on a plaque outside the north end of the biggest cist grave in the interior of the structure.[41]

In structure 6 the presence of a small group of complete vases in area ΣT—most of them found upside down—can also stimulate discussion about their function. This group consists of FSF (wheelmade) vases (Fig. 4), specifically four drinking vessels (skyphoi and cups), an oinochoe and a trefoil lekythos. Further examination of the material will, it is hoped, indicate whether these vases, grouped together and associated with pouring and drinking, were connected with some kind of funerary rite.[42]

Quantification of material evidence cannot be considered as a way for archaeologists to produce unassailable results, but its utilization should be encouraged in studies of Early Iron Age Greece, provided that the research questions are already clearly formulated. Quantitative analyses cannot in themselves provide definite answers but, combined with other methods and ways of interpretation, they can lead to a better understanding of the different aspects of the mortuary domain.

These comments on the quantification process from Tsikalario may, it is hoped, be useful for research at other burial sites, such as the Grotta area and the Metropolis area at Chora on Naxos, where multiple phases of use have been discovered. The use of quantitative analysis in examining the burial plots of Naxos will help us to identify more clearly similarities and/or differences between the burial customs of Chora and Tsikalario. It would also be desirable for scholars of Early Iron Age Naxos to adopt a common quantitative analytical framework because differences in method can sometimes inhibit the comparison of quantified material data. In any event, we will in future need to factor the diversity of the types of funerary structures that are present at the burial sites of Chora and inland Naxos into our quantitative analyses.[43]

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[34] Papadopoulou-Zaphiropoulou 1965, 515.

[35] Organic residue analysis of ceramic artefacts, which offers a way to discover what an ancient vessel was used for, has shown that GC/MS (Gas Chromatography coupled with Mass Spectrometry) can be an effective technique for the detection and identification of organic remains in archaeological material (detailed protocol in Charters, Evershed and Blinkhorn *et al.* 1995).

[36] Relevant literature for amphorae as ash urns at Athens: Papadopoulos 2005, 374. For Crete, see Coldstream and Catling 1996, 660–665; kraters were also frequently used as urns at Knossos.

[37] Zaphiropoulou 2001a, 294, figs. 37–38.

[38] Kourou 1999, 25, 155, 162 (no. 59, inv. 474 and 5571, pl. 52a,c).

[39] In other places, for example at Torone and on Crete, various vessel shapes are recorded as having been used as urns (Crete: Desborough 1972, 226; Coldstream and Catling 1996, 659–660. Torone: Papadopoulos 2005, 374–376).

[40] Coldstream 1987, 338; Coldstream and Catling 1996, 716; Kotsonas 2008, 308.

[41] Papadopoulou-Zaphiropoulou 1965, 522, fig. 20. The two cist graves in the middle of funerary structure 10, probably indicating two related burials, were robbed.

[42] Kurtz and Boardman 1971, 210–211. It should be noted that in structure 6 carbonized fruits—mainly figs—were also found, another potential indication of funerary rites: for carbonized fruits in burials, see Papadopoulos 2005, 390.

[43] Indicatively Kourou 1999, 161–182; Papadopoulos and Smithson 2002, 183.

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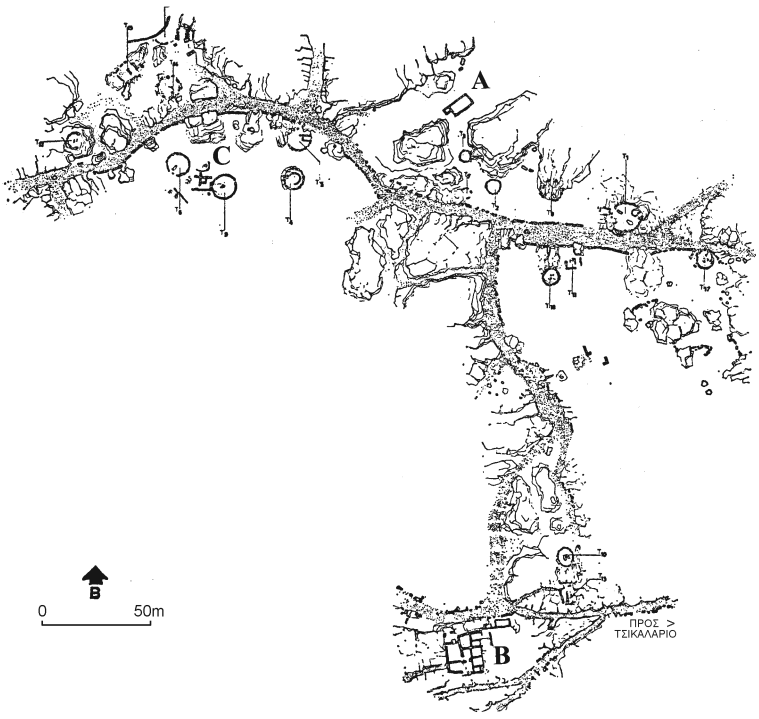


Fig. 1: Plan of the Tsikalario necropolis.

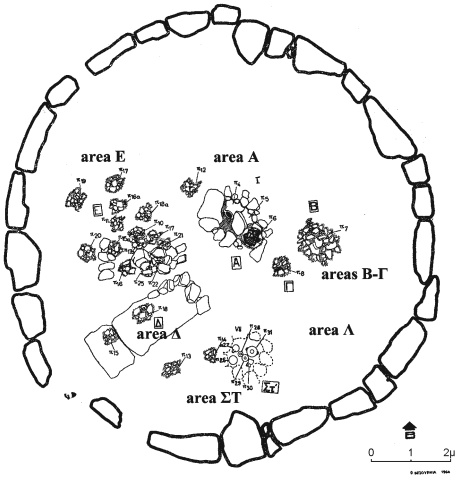


Fig. 2a: Tsikalario, circular funerary structure 6: distribution of artefacts inside the structure.

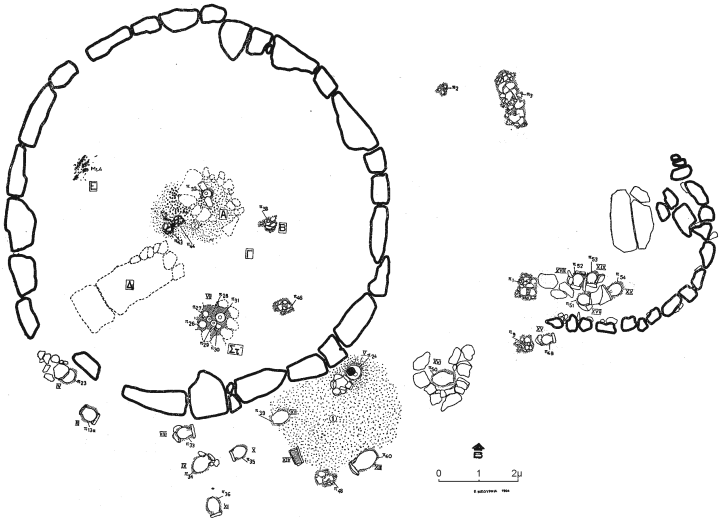


Fig. 2b: Tsikalario, funerary structure 6 and its vicinity.

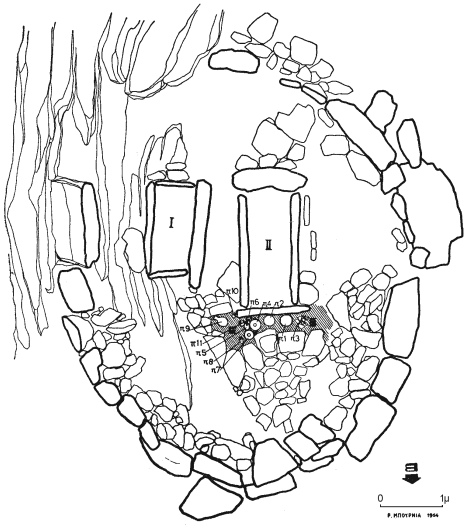
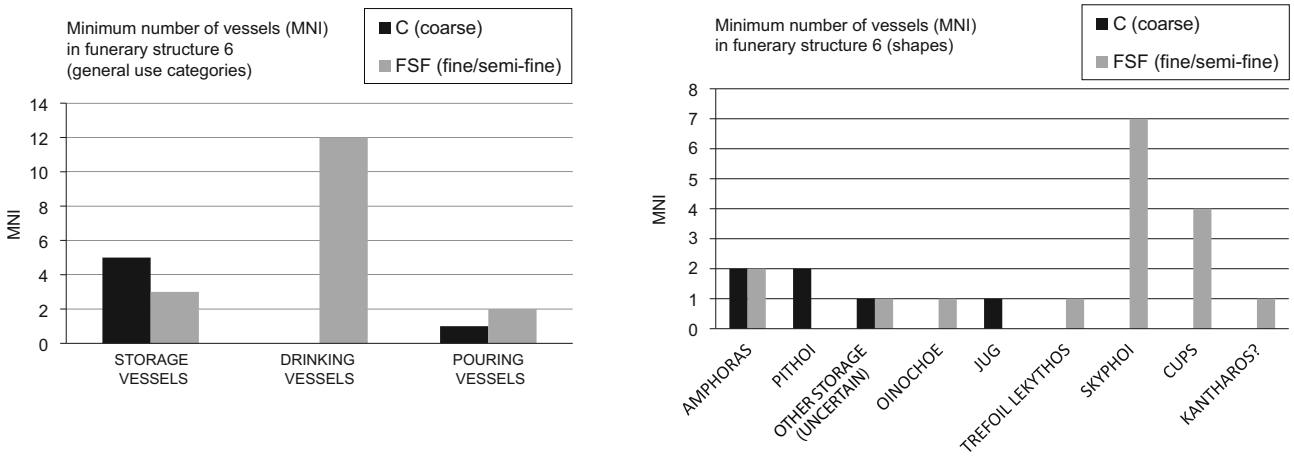


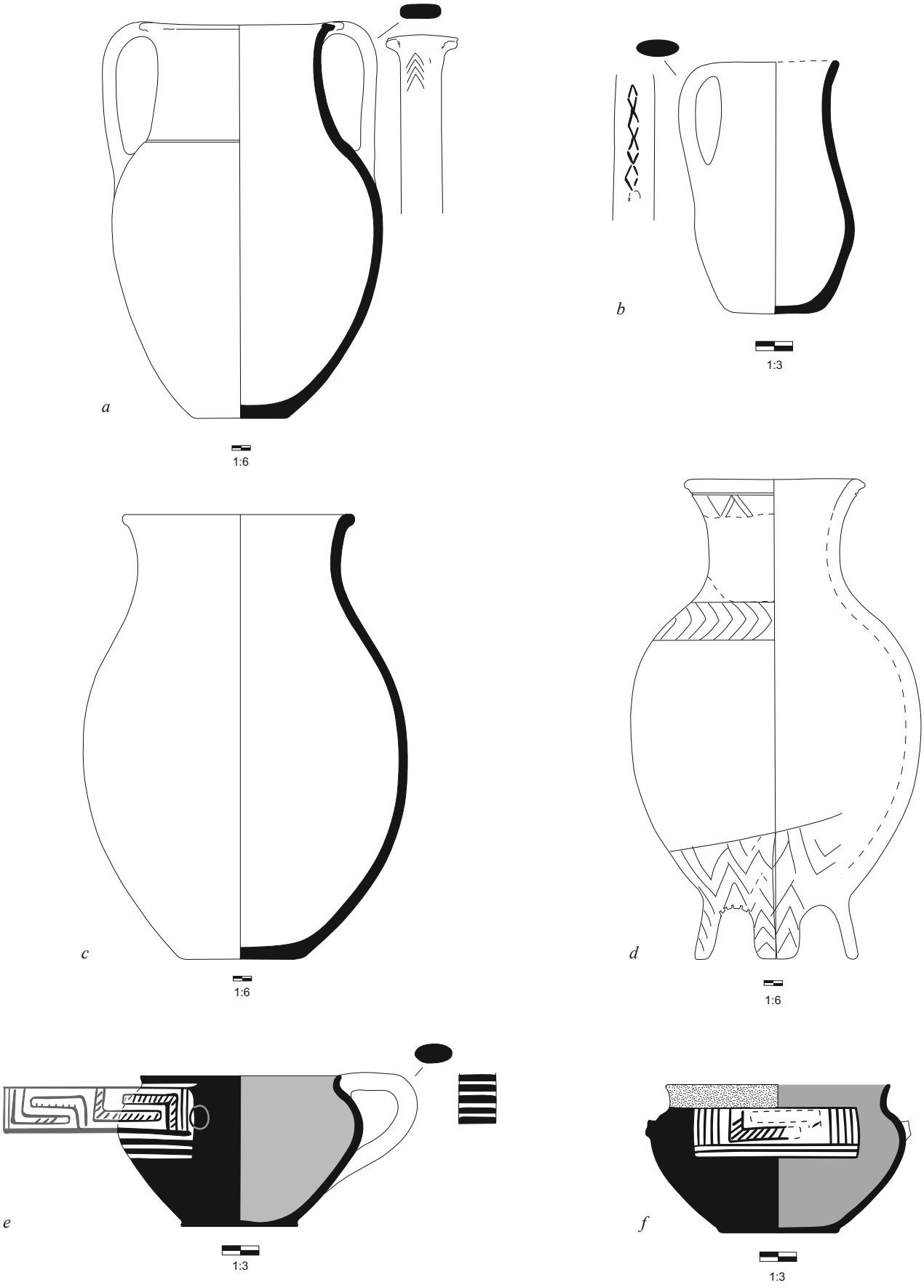
Fig. 3: Tsikalario, funerary structure 10.

CIRCULAR FUNERARY STRUCTURE 6 Number of Remains (NR): 740 sherds Minimum Number of Vessels (MNI): 23 pots	
CONTEXT	**FSF (FINE/SEMI-FINE) OR C (COARSE) WARE**
AREA A (CENTRE)	C amphora (inv. no. 3825, Fig. 6a)
	C small jug (inv. no. 3829, Fig. 6b)
	C pithos (inv. no. 3827, Fig. 6c)
	FSF amphora (inv. no. 3828)
	FSF skyphos (inv. no. 3830)
	FSF cup (inv. no. 3826, Fig. 6e)
AREA A (OTHER MATERIAL)	FSF cup (inv. no. 3909)
	FSF cup (inv. no. 3911)
AREAS B-Γ	C tripod pithos (inv. no. 3831, Fig. 6d)
AREA Δ (ON A PLAQUE)	FSF closed vessel (amphora?) (inv. no. 3912)
AREA E	C amphora (inv. no. 3849)
	C closed vessel (amphora or pithos?) (inv. no. 3846)
	FSF closed vessel (probably amphora) with triple-loop feet (inv. no. 3848)
	FSF skyphos (inv. no. 3908)
	FSF skyphos (inv. no. 3847)
	FSF drinking vessel (kantharos?) (inv. no. 10975)
AREA ΣΤ	FSF oinochoe (inv. no. 3854)
	FSF trefoil lekythos (inv. no. 3851)
	FSF skyphos (inv. no. 3853)
	FSF skyphos (inv. no. 3852, Fig. 6f)
	FSF skyphos (inv. no. 3855)
	FSF cup (inv. no. 3850)
AREA Λ	FSF skyphos (inv. no. 3819)

Fig. 4: Table: Minimum Number of Vessels (MNI) per ware category (based on macroscopic examination) and shape in the interior of funerary structure 6: distribution of the ceramic evidence according to location of discovery.



Figs. 5a–b: Graphs: Minimum Number of Vessels (MNI) per ware category (based on macroscopic examination) and shape.



Figs. 6a–f: Tsikalario, a selection of vases from the interior of funerary structure 6 (all in the Naxos Museum): a) amphora with horn-like handle terminals inv. no. 3825, b) burnished small jug, inv. no. 3829, c) plain pithos, inv. no. 3827, d) tripod pithos with incised decoration, inv. no. 3831, e) cup with painted decoration, inv. no. 3826, found inside amphora, inv. no. 3825, f) skyphos with painted decoration, inv. no. 3852 (drawings: X. Charalambidou).